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DRU Workshop 2011 Presentations - Disaster
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Conferences and Workshops

2-2011

A Mathematical Model of Terrorism

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The University of New Orleans

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Thursday, February 17, 2011

Workshop Session II

Time of Session: 1:30-3:00pm

Session Title: Crisis Decision-Making Support

Speaker: Phillip Van Saun, University of California-San Diego (Crisis Decision-Making and the Use of Micro-Games)

        Jairo Santanilla, University of New Orleans (A Mathematical Model of Terrorism)

Room: 256

Head Count: 19

Note Taker: Carrie Beth Lasley

Notes:

Phillip Van Saun

        How does the decision-making process go? Where does bias come in?

        Micro-games

                Problem based learning, heuristic games

        Crisis Management usually not in business schools

                Only offered as an elective, unlikely to select it due to cost

        Risk isn't usually given to business people, but delegated

                Learn management structure during crisis, overestimate our control in the crisis

        Biases

                Rational actor, information, perceptual, mental noise, probability neglect, confirmatory bias

        Baja Earthquake

                Many students believed "triangle of life" but should "duck, cover, hold on." Campus ES had to convince students of proper method.

Fast and Frugal heuristics

Ecologically rational, limited time or information, incorporate psychological bias, can be modeled (good decisions and bad)

Fluency heuristic

The alternative that comes up first is probably best

Take the best

Take the best of alternatives

Applied to WTC and Morgan Stanley

Al Queda comes btack to targets

Boss says leave

MTA says stay, but 2,700 leave and survive

Micro-games

Problem based learning, facilitate game, not lead, encourage brain storming, adjust and incorporate bias, guide to fast and frugal, close with what learned, what to change, focus on strategy, expect struggle.

Current status→ potential situation→ look for previous occurrences→determine possible moves→ project payoffs for possibilities→ pick something

Crisis Decision making

A good enough decision, made soon enough, communicated well, carried out well, imperfect care givers better than perfect care withheld

Teach good decision making

People get stuck in mode when faced with decision

Others who are younger can be more open to deliberate processes in decision making

Jairo Santanilla

Sinx/n= six

Fighting terrorism with math

Algorithms and equations are promising in counter terrorism

Complex systems

Patterns are universal, Richardson's law = $p(x)= x$

Dynamical Systems

Number of bad guys change over time, L=leaders, l= low members, S= strength or $S=mL(t)+l(t)$; L grows at rate proportional to l and decreases proportionally as well; L(t) decreases with counter terrorism aimed at L at constant rate (b); so what is the impact of resources in counter terrorism (see diagram)

You can then predict if group will grow or collapse

Threshold line + Trend lines dictate model (not to be passed)

Group below threshold then current counter terrorism is enough

A terrorist organization would collapse if counter terrorism measures produce decline in strength and decline in low rank members-Not true